

What is claimed is:

1 1. A charge pump device for supplying a step-up voltage to a host,
2 the device comprising:

3 *Sub B9* a charge pump part constructed with first to nth unit charge
4 pumps; and

5 a multi-level detector for detecting a level of a step-up voltage to
6 selectively drive the unit charge pumps in accordance with an amount of
7 power consumption of the host and thereby outputting at least one level
8 detection signal.

1 2. The charge pump device of claim 1, further comprising:

2 an oscillator for producing a pulse signal in accordance with the
3 level detection signal of the multi-level detector; and

4 a logic operation part for performing a logic operation on the
5 pulse signal of the oscillator and the level detection signal produced from
6 the multi-level detector, and outputting the operated signal to the charge
7 pump part.

1 *Sub C1* 3. The charge pump device of claim 1, wherein the first unit
2 charge pump is always driven by the level detection signal output from
3 the multi-level detector.

1 4. The charge pump device of claim 1, wherein all of the first to
2 nth unit charge pumps are driven when the amount of power

3 consumption by the host is high.

1 Sub B10 5. The charge pump device of claim 1, wherein the second unit
2 charge pump is driven when the amount of power consumption by the
3 host is low.

1 6. The charge pump device of claim 1, the multi-level detector
includes:

2 a voltage distributor for dividing a step-up voltage into first to nth
3 voltage levels; and

4 first to nth level detectors for comparing the first to nth voltage
5 levels to a reference level.
6

1 Sub C1 7. The charge pump device of claim 1, wherein each of the first to
2 nth level detectors includes a differential amplifier.

1 8. The charge pump device of claim 6, wherein the first voltage
2 level is lower than the reference level.

1 Sub B11 9. A charge pump device associated with a host, comprising:
2 a charge pump part including first to nth unit charge pumps;
3 a multi-level detector detecting a level of a step-up voltage so as
4 to selectively drive the unit charge pumps in accordance with an amount
5 of power consumption of the host;
6 a signal generator producing a pulse signal in accordance with a

7 level detection signal of the multi-level detector; and

8 a logic operation part operating on the pulse signal of the
9 oscillator and a level detection signal produced from the multi-level
10 detector, and thereby outputting an operated signal to the first to nth
11 unit charge pumps.

1 10. The charge pump device of claim 9, wherein the multi-level
2 detector includes:

3 a voltage distributor for dividing a power source voltage into first
4 to nth voltage levels; and

5 first to nth level detectors detecting a plurality of levels of the
6 step-up voltage by comparing the first to nth voltage levels divided by the
7 voltage distributor with a reference level.

1 11. The charge pump device of claim 10, wherein each of the first
2 to nth level detectors includes a differential amplifier.

1 12. The charge pump device of claim 10, wherein the first voltage
2 level is lower than the reference level.

1 13. The charge pump device of claim 9, wherein the first unit
2 charge pump is always driven by the level detection signal output from
3 the multi-level detector.

1 14. The charge pump device of claim 9, wherein all of the first to

2 nth unit charge pumps are driven when power is turned on the host or
3 the amount of power consumption by the host is high.

1 Sub B13 15. The charge pump device of claim 9, wherein the second unit
2 charge pump is driven when the amount of power consumption by the
3 host is low.

16. The charge pump device of claim 9, wherein the logic operation part performs a NAND operation on the pulse signal and the level detection signal.

17. The charge pump device of claim 2, wherein the logic operation part performs a NAND operation on the pulse signal and the level detection signal.